

## Selected Abstracts from *Yogyo-Kyokai-Shi*

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### Effects of Starting Powders on Properties of Normally Sintered and HIP'ed $\text{Si}_3\text{N}_4$

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*Six kinds of  $\text{Si}_3\text{N}_4$  starting powders which were mixed with 6 wt%  $\text{Y}_2\text{O}_3$ , 2 wt%  $\text{Al}_2\text{O}_3$  and 3 wt%  $\text{MgO}$  as densification aids, were pressed and normally sintered at 1550°-1650°C. The sintered compacts were HIP'ed without capsule in a nitrogen atmosphere of 100 MPa at 1700°C. Density, flexural strength and  $\alpha$ -to  $\beta$ -phase transformation were studied. The results obtained are summarized as follows :*

- ( 1 ) *Density and strength of HIP'ed  $\text{Si}_3\text{N}_4$  compacts were strongly affected by characteristics of starting powders such as specific surface area, green density and amount of  $\alpha$ -phase.*
- ( 2 ) *The mean strength of sintered compacts of which starting powder had a specific surface area of 14.2  $\text{m}^2/\text{g}$  and contained 97%  $\alpha$ -phase, increased from 370 to 870 MPa by HIP treatment.*
- ( 3 ) *Improvement of strength depends on  $\alpha$ -to  $\beta$ -phase transformation and the formation of fibrous grain in  $\text{Si}_3\text{N}_4$  compacts during HIP treatment.*

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